



Bio-Informatics Group, Inc. - 2000 Regency Parkway - Suite 395 - Cary, NC 27511

RECEIVED  
CENTRAL FAX CENTER

JUN 23 2004

To: Jezia Riley, Examiner **OFFICIAL**  
From: Ben Liu  
Total: 22 pages (including this page)

June 23, 2004

Jezia Riley, Examiner  
USPTO  
Remsen Building, 400 Dulang St.  
Alexandria, VA 22314-5774

Dear Examiner Riley:

Thank you very much for talking with me on the phone regarding **Patent Application #10/055878** entitled *Four dimensional biochip design for high throughput applications and methods of using the four dimensional biochip.* The attached is our official responses to the Office Action date mailed 05/05/2004. The responses include a brief explanation, a claim listing, and the amended claims.

Many thanks for your help.



Ben Liu  
Inventor of Application 10/055878  
Office Phone: 919-468-5552 extension 222  
Cell Phone: 919-244-7975

Office Address: Ben Liu, Ph.D.  
Bio-Informatics Group, Inc.  
2000 Regency Parkway, Suite 395  
Cary, North Carolina 27511

Home Address: Ben Liu  
5720 Thistleton Lane  
Raleigh, North Carolina 27606

RECEIVED  
CENTRAL FAX CENTER

JUN 23 2004

**Response to Office Action (date mailed 05/05/2004)**

OFFICIAL

Application No. 10/055,878  
Applicant Liu, Ben Hui  
Examiner Jezia Riley  
Art Unit 1637  
Address: Remsen Building, 400 Dulang ST.  
Alexandria, VA 22314-5774

**Title: Four dimensional biochip design for high throughput applications and methods of using the four dimensional biochip**

**Response to the Detailed Action Items 1 and 2:**

In Item 2, Claims 17-35 were rejected under 35 U.S.C. 112 and based on insufficient antecedent basis for the limitations "the reservoir and the substrate" in the Claim 17.

*Response:*

We have revised the Claim 1 based on your concerns. Please see the amended claims.

**Response to the Detailed Action Items 3 and 4:**

In Item 4, Claims 1-8, 10-12, 15, 16 were rejected under 35 U.S.C. 102(e) and based on Guzman patent (US 6,406,604).

*Response:*

The main body of our patent application (no. 10/055878) covers (1) the biochip design (biochip 20) (see enclosed different forms of the biochip 20), (2) the ways to form interconnected biochips (Fig. 4), and (3) the apparatus to transfer liquid from the reservoir 120 to the biochips.

Guzman patented a multi-dimensional electrophoresis apparatus based on perpendicularly inter-connected capillaries. Our patent application has no relationship with electrophoresis at all. The apparatus explained by Guzman (FIG 1 of US 6,406,604) fundamentally differs from the biochip 10 (Figs 1 and 4 in our application 10/055878). The biochip in our patent application (no 10/ 055878) is an apparatus composed with a biochip 20 with parallel vertical cylinders 50 and the cylinders are connected selectively by the two surfaces 30 and 40. Probes (or biological materials) are immobilized on the inner wall 56 of the cylinder 50 (which is fundamentally differ from Guzman patent).

We do not think that the materials for manufacturing the biochip have any relationship with the patentability of our current patent applications.

**Response to the Detailed Action Items 5 and 6:**

In the Item 6, Claims 1-53, 88 and 89 were rejected under 35 U.S.C 103 and based on patents of Guzman (US 6,406,604) and Shmidt et al (US 5,131,994) and application by Borrelli et al (WO99/55460).

*Response*

Patent application 10/055878 has nothing to do with gel electrophoresis. The structures of the biochip and related instrument fundamentally differ from the structures in the referenced patents of Guzman (US 6,406,604) and Shmidt et al (US 5,131,994) and the application by Borrelli et al (WO99/55460).



Ben Liu  
Inventor of Application 10/055878  
Office Phone: 919-468-5552 extension 222  
Cell Phone: 919-244-7975

Office Address: Ben Liu, Ph.D.  
Bio-Informatics Group, Inc.  
2000 Regency Parkway, Suite 395  
Cary, North Carolina 27511

Home Address: Ben Liu  
5720 Thistleton Lane  
Raleigh, North Carolina 27606